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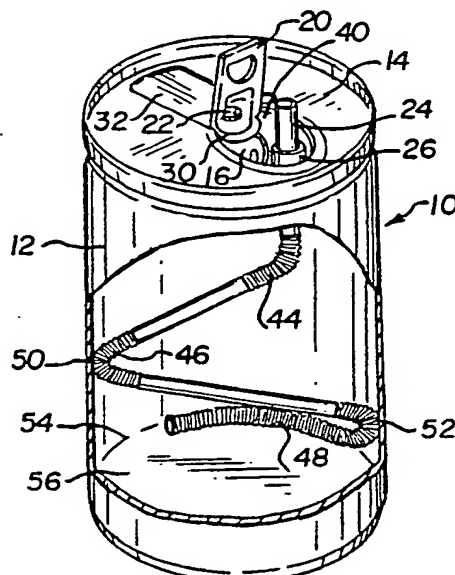
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(54) Title: BEVERAGE CONTAINER WITH AUTOMATIC STRAW DELIVERY MECHANISM AND STRAW THEREFOR



(57) Abstract

A beverage container (10) having a metallic lid (14) with a bend down panel (16) on the lid to define an opening for the lid (18). A rupturable score line (18) separates the panel (16) from the lid (14) and facilitates detachment of the panel (16) from the lid (14) and bending of the panel (16) downwardly to provide the opening while a portion of the panel remains hingedly attached to the lid. A non-detachable pull tab (20) is secured to the top of the lid (14) for applying a manual force for rupturing the score line (18) and bending the lid (14) downwardly. A rotatable straw delivery mechanism (26) holding a straw (24) is secured to the underside of the lid. The straw delivery mechanism (26) is positioned to permit the panel (16) to bend downwardly to provide straw-free drinking access through the opening when the panel (16) is depressed to a first position. When the panel is then depressed further to a second position, the panel comes into contact with a contact elbow on the straw delivery mechanism (26). This contact rotates the straw delivery mechanism (26) to provide the pop-up straw (24) through the opening.



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BEVERAGE CONTAINER WITH AUTOMATIC STRAW
DELIVERY MECHANISM AND STRAW THEREFOR

This invention relates to a container for a beverage, such as carbonated soft drinks, fruit juices, etc., wherein the container has a pull tab for depressing a lid panel to provide an opening for the container.

5

More particularly, this invention relates to a beverage container having a pop-up straw entirely enclosed within the container.

- 10 Still more particularly, this invention relates to a beverage container having an interior automatic straw delivery mechanism for delivering a pop-up straw through the container opening. The container can be opened by depressing the lid panel to a first position, permitting
15 to the consumer straw-free drinking of the liquid content directly from the container by tilting the container at the consumer's mouth. The container can be opened further by depressing the lid panel an additional amount to a second position at which the straw delivery
20 mechanism is actuated and a pop-up straw appears at the opening so that the consumer can drink the liquid content through the straw.

- This invention also relates to a pop-up straw for pre-
25 pop-up storage entirely within the beverage container. The pop-up straw can be provided with corrugations. The straw can be straight but is preferably bent and/or curved to impart stability to the straw during transport and to provide a spring-like quality to the straw to
25 induce the pop-up characteristic. If the straw is bent, it can be bent into a zigzag pattern.

- The beverage container of this invention has a metallic lid with a bend down panel on the lid to define an
30 opening for the lid. A rupturable score line is

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impressed to separate the panel from the lid and to facilitate detachment of the panel from the lid to provide the opening upon bending the panel while a portion of the panel remains hingedly attached to the lid. A non-detachable pull tab is secured to the top of the lid for applying a force for rupturing the score line and bending the lid downwardly.

A straw is retained entirely within the closed container and is held within the container by a rotatable straw holding and delivery mechanism. The mechanism can be rotatably secured to the underside of the lid by means of a rivet whose head is on the underside of the lid. The straw delivery mechanism is positioned laterally with respect to the panel to permit the panel to bend downwardly to provide drinking access through said opening. The panel comes into contact with a projecting elbow in the straw delivery mechanism during bending. This contact rotates the straw delivery mechanism to the opening to provide a pop-up straw through the opening.

The straw delivery mechanism is secured to the underside of the lid at a position to permit downward bending of the panel to a first position to provide optional straw-free drinking access through said opening. The mechanism is positioned so that downward bending beyond the straw-free access position to a second position brings the panel into contact with the mechanism causing rotation of the mechanism to deliver a straw to the opening.

The straw delivery mechanism is out of contact with the panel and clear of the opening as the panel initially bends downwardly from the closed position to provide the straw-free drinking access through the opening by tilting the container directly at a consumer's mouth. In this

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panel position drinking occurs without interference of the straw or of the straw delivery mechanism. The panel subsequently comes into contact with the straw delivery mechanism as the panel bends further to the contact position. The contact moves the straw delivery mechanism to the opening in the lid to provide a pop-up straw through the opening.

The straw delivery mechanism can take many forms. For example, the straw delivery mechanism can comprise a U-shaped or arc-shaped arm with the arm rotatably secured at an intermediate position thereof to the underside of the lid. One end of the arm can be provided with a downwardly projecting elbow, with the elbow being positioned for contacting the bottom of the panel for rotating the arm. The other end of the arm is provided with a receptacle for holding the straw. It is this receptacle which is rotated to the opening.

In another embodiment, the straw delivery mechanism can comprise a U-shaped or arc-shaped arm, with the arm slideably and rotatably secured at one end thereof to the underside of the lid. The other end of the arm is provided with a receptacle for holding a straw to be rotated to the opening. The end secured to the underside of the lid has a downwardly projecting elbow positioned to be contacted by the underside of the panel. The arm can be secured to the panel by means of a rivet whose head is on the underside of the lid. The arm can first slide along the rivet and then rotate about the rivet. Guide elements are provided on the underside of the lid to guide the arm as it slides and rotates. The exterior edge of the arm can comprise a cam whose movement along one of the guide elements induces rotation.

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If desired, the straw can be corrugated in an accordian-like manner at one or more positions, including the bottom of the straw and intermediate straw positions. The corrugations facilitate bending and curving of the straw to provide stability to the straw during transport and to provide springiness to the straw to induce the pop-up characteristic.

It is not essential that the straw be corrugated. By employing a suitable material, a straw can be provided which can be conveniently bent and curved without corrugations. Also, a straight straw can be employed.

In an advantageous embodiment, the straw can have a vertical straight top section and at least two bends below the top section with a downwardly inclined straight section descending from each bend. Sequential inclined sections incline downwardly in generally diametrically opposite directions so that the straw can bear upon the cylindrical wall of the container at diametrically opposite sides of the wall.

In another embodiment, the straw can have a vertical straight top section and at least one bend below the top section with a straight inclined section descending from each bend so that the straw can bear upon the cylindrical wall of the container. The bottom section of the straw can be curved with the curved section bearing upon the junction of the cylindrical wall and the bottom of the container.

In a particular embodiment, the straw can comprise a vertical straight top section and three bends below said top section. A first straight downwardly inclined section descends from the first bend to a second bend. The second bend is adapted to bear upon the cylindrical wall of the container at a first position thereon. A second straight downwardly inclined section

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descends from the second bend to a third bend. The third bend is adapted to bear on the cylindrical wall of a container at a second position thereon. Said first and said second positions can be in diametrically opposite sides of the cylindrical wall. This results in a zigzag straw configuration. The third bend leads to a curved bottom section of the straw. The curved bottom section is adapted to bear on the curved junction of the cylindrical wall and the bottom of the container.

10 This invention also relates to a method for the manufacturing assembly of a cylindrical beverage container having a lid wherein the lid has a pull tab and a bend down panel for providing an opening on the lid and wherein the underside of the lid has an attached straw
15 delivery mechanism. This method comprises inserting a bent and curved straw into the delivery mechanism and then inserting the lid with the inserted straw into the container so that the straw bears upon the interior surface of the container at multiple positions on the
20 wall and bottom thereof. Then, the lid is sealed to the container whereby the straw is compressed in the container so that the straw will pop up upon pulling the pull tab and bending down the panel.

This invention also relates to a method of
25 using a beverage container whose lid has a pull tab and a bend down panel for providing an opening on the lid wherein the underside of the lid has an attached straw delivery mechanism holding a pop-up straw for delivery through the opening. The method comprises pulling the
30 pull tab to bend the panel downwardly to a first position without actuating the straw delivery mechanism. The first position provides an opening in the lid for drinking liquid from the container without the straw. Then, the pull tab is additionally pulled to bend the
35 panel downwardly further to a second position. The

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additional pulling step actuates the straw delivery mechanism to pop up the straw through the opening.

This invention will be more completely understood by reference to the attached drawings in

5 which:

Figure 1 is a cutaway view of a beverage container of the invention with closed lid;

Figure 2 is a cutaway view of the beverage container of Figure 1 with the lid open to a drinking
10 position;

Figure 3 is a cutaway view of the beverage container of Figure 1 with open lid and pop-up straw;

Figure 4 is a top view of a closed lid;

Figure 5 is a bottom view of a closed lid with
15 a straw delivery mechanism;

Figure 6 is a bottom view of the lid of Figure 5 open to a drinking position without pop-up straw;

Figure 7 is a bottom view of the lid of Figure 5 open to a drinking position with straw in pop-up
20 position;

Figure 8 is a cutaway view of a container with straw; Figure 9 is an exploded view to illustrate the assembly of a lid with straw into a beverage container;

Figure 10 illustrates manual bending of a pop-up straw during use;
25

Figure 11 is a cross-sectional view of a lid fragment illustrating rivets on the upper and lower lid surfaces;

Figures 12, 13 and 14 illustrate various straws
30 within a beverage container;

Figure 15 is a bottom view of a closed lid having a straw delivery assembly;

Figure 16 is a bottom view of the lid of Figure 15 open to a drinking position without pop-up straw; and

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Figure 17 is a bottom view of the lid of Figure 15 open to a straw pop-up position.

Figure 1 shows beverage container 10 having cylindrical wall 12 and top lid 14. Lid 14 is closed by panel 16 which is demarked from lid 14 by weakened and rupturable score line 18. Non-detachable pull tab 20 is attached to lid 14 by means of rivet 22. A straw delivery mechanism disposed for holding and moving straw 24 is disposed within container 10 on the underside of lid 14. The mechanism is more clearly shown in Figure 5, 6 and 7 but is mostly obstructed from view in Figure 1. However, Figure 1 shows cylindrical straw holding receptacle 26 and downwardly projecting elbow 28 of the mechanism.

Figure 2 shows pull tab 20 in a manually lifted position at approximately 90 degrees. As stated, tab 20 is secured to lid 14 by rivet 22 and upon lifting of tab 20 its front end 30 is pushed downwardly so that it abuts against the top side of panel 16 to detach panel 16 from lid 14 at score line 18 and bend panel 16 downwardly into container 10. Figure 2 shows panel 16 depressed to a first position at which lid 14 is open to provide drinking access of the lips and mouth of a consumer to the liquid contents of container 10 upon tilting of the container 10. However, at the position of panel 16 shown in Figure 2 the underside of panel 16 has not yet contacted elbow 28 of the straw delivery mechanism, so that straw 24 remains in its normal or retracted position laterally removed from the opening of lid 14.

Figure 3 shows pull tab 20 manually pulled still further at approximately 90 degrees so that front end 30 of tab 20 further depresses panel 16. In the position of panel 16 shown in Figure 3, the underside of panel 16 contacts elbow 28, which is hidden from view in Figure 3, so that straw holding receptacle 26 is rotated

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laterally on a horizontal plane towards the opening in lid 14, allowing straw 24 to resiliently spring upwardly through the opening.

Figures 4 and 5 are top and bottom views, respectively, of lid 14 showing the lid in its normal or closed position and the straw holding mechanism in its normal or retracted position. As shown in Figure 4, pull tab 20 rests horizontally in depression 32 in lid 14 and panel 16 is joined contiguously with lid 14 and score line 18 is not yet severed. Figure 5 shows straw delivery mechanism 34 comprising U-shaped or arc-shaped arm 36 rotatably secured to the underside of lid 14 by rivet 38. One end of arm 36 comprises downwardly depressed elbow 28 and the other end comprises cylindrical straw holding receptacle 26. As shown in Figure 5, when panel 16 is in its closed position and score line 18 is not yet severed, straw receptacle 26 is laterally disposed with respect to panel 16 and bent elbow 28 is out of contact with the underside of panel 16.

Figure 6 shows panel 16 downwardly bent to a first position to provide opening 40 in lid 14. Opening 40 is adequate to provide drinking access by a beverage consumer by applying the mouth and lips directly to the edge of lid 14 when the container is tilted without using a straw. At the first lid opening position shown in Figure 6, the underside of lid 16 has not yet come into contact with elbow 28 of straw delivery mechanism 34. Thereby, there is no rotation of mechanism 34 and straw receptacle 26 remains under lid 14 and laterally disposed with respect to opening 40.

Figure 7 shows panel 16 depressed further to a second position. Panel 16 remains hingedly connected to lid 14 at edge 42 and is bent downwardly and to a side to the second position shown in Figure 7, so that panel 16

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pushes against elbow 28. The resulting movement of elbow 28 causes arm 36 to rotate on rivet 38 to rotate straw holding receptacle 26 underneath opening 40 to supply a resilient pop-up straw to opening 40.

5 Figure 8 shows straw 24 in its pop-up position with the end of straw 24 projecting upwardly through opening 40 and above lid 14. Figure 8 shows that straw 24 is provided with a plurality of accordin-like corrugated regions 44, 46 and 48. The corrugations
10 provide flexibility and a spring like quality to straw 24. The corrugations also allow the straw to bear upon the interior surfaces of container 10 at a plurality of diametrically opposing locations in order to provide stability to straw 24 during transport of container 10.
15 For example, the bending of the straw at corrugations 46 allows the straw to bear upon the interior wall of cylinder 12 at position 50 and the bending of straw at corrugations 48 allows the straw to also bear upon a diametrically opposite position 52 of the interior wall
20 of cylinder 12. Support of the straw at diametrically opposite bearing points 50 and 52, respectively, provides stability to the straw.

Additional stability is imparted to the straw by coiling or curving the corrugations at the bottom end
25 of the straw along circular seam 54 formed between container bottom 56 and cylindrical wall 12. The curving of corrugated region 48 along seam 54 can extend along some or all of the circumference of seam 54.

The bearing of bent corrugated regions of the
30 straw at opposing positions 50 and 52 of the interior wall of cylinder 12 and the curving of a corrugated bottom region of the straw along circular bottom seam 54 provides not only stability to the straw so that the straw tends to maintain a constant position and is
35 relatively free of movement during transport of the

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container but also provides a spring-like or resilient characteristic to the straw. This spring-like quality causes the straw to pop-up when receptacle 26 is rotated to opening 40, as shown in Figure 8, at which position
5 straw 24 is no longer restrained by the underside of lid 14. After pop-up of the straw, the straw can be manually grasped and manually pulled up further, as shown in Figure 10, until corrugated region 44 extends at least partially above receptacle 26, allowing straw 24 to be
10 manually bent towards the drinker.

Figure 9 is an exploded view of the container assembly to illustrate a preferred method of manufacture of the container assembly. The container assembly initially comprises three sub-assembly elements,
15 including lid 14, straw 24 and container 12. Straw 24 is prefabricated with corrugated regions 44 and 46 corrugated region 48 which is bent and curved to conform with the in-container straw positioning shown in Figure 8. Straw 24 is inserted into receptacle 26 and the
20 combination lid-straw subassembly can be lowered into cylinder 12 which is pre-filled with beverage, followed by welding or otherwise sealing of lid 14 onto cylinder 12. Straw 24 is somewhat compressed within cylinder 24, as shown in Figure 14, by virtue of the straw material
25 and the accordian-like nature of the corrugations to provide a spring-like or resilient quality to the straw to accomplish the straw pop-up characteristic illustrated in Figure 8. The straw material can comprise plastic, paper or plastic-coated paper.

30 Figure 11 presents a cross-section detail of lid 14, showing that lid 14 is provided with two similar but oppositely positioned rivets including one rivet having its head at the upper surface of lid 14 and one rivet having its head at the lower surface of lid 14.
35 Rivet 22 is used to capture pull tab 20 and has head 58

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on the upper surface of lid 14 and well 60 along the lower surface of lid 14. Rivet 38 is used to rotatably capture arm 36 of straw rotation mechanism 34 and has head 62 on the lower surface of lid 14 and well 64 on the upper surface of lid 14.

Figures 12 and 13 illustrate other straws that can be employed with the straw delivery mechanism of the invention. Figure 12 shows straw 66 which is straight and unbent over its entire extent. The buoyancy of the beverage fluid is employed to pop straw 66 upwardly. Figure 13 shows a straw which is pre-formed with a resiliently bent and curved configuration, but without corrugations. It is noted that the straws of Figures 13 and 14 are ecology straws in that their bent and curved configurations make it difficult to remove these straws entirely from the container and makes it nearly impossible for these straws to be accidentally separated from the beverage container after use.

Figures 15, 16 and 17 illustrate a different straw delivery mechanism than is described above. The mechanism of Figures 15, 16 and 17 employs both linear and rotary movement for positioning a straw at a container opening. These figures show the underside of lid 70. In Figure 15, panel 72 is closed and score line 74 is not broken. A U-shaped or arc-shaped arm 78 is provided with a straw holding receptacle 80 at one end and a downwardly extending elbow 82 at the other end. Movement of the straw is restrained during shipment by means of guide or rivet 84 on one side of the arm and guide 86 on the other side of the arm. One end of arm 78 is provided with elongated slot 88 which is slideably captured by rivet 90.

Figure 16 shows panel 72 bent downwardly to a first position to provide opening 92 for drinking. However, the bending of the underside of panel 72 at said

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first position is limited so that the underside of panel 72 is not yet in contact with elbow 82 and no movement has yet been imparted to straw delivery mechanism 76.

Figure 17 shows panel 72 bent further to a
5 second position whereat it is bent more than 90 degrees and is connected to lid 70 at hinge 94. In this position the underside of panel 72 has contacted elbow 82 and has forced arm 78 rearwardly in a linear direction along linear slot 88 while arm 78 remains within the confines
10 determined by guide members 84 and 86. Finally, when mechanism 76 is moved linearly to an extend that it is free of the restraint of guide member 86, as shown in Figure 17, further movement under the influence of panel 72 causes rotary movement of arm 78 by movement of cammed
15 edge 96 of arm 78 along guide 84 so that arm 78 rotates about rivet 90 to move straw holding receptacle 80 under opening 92. In this position, mechanism 76 is deprived of the stabilizing effect of guide 86. However, downwardly impressed dimple 98 in lid 70 pressing against
20 arm 78 can be used to retain arm 78 in a stable condition during drinking.

The details of a preferred resilient pop-up straw are shown in Figure 14. Straw 26 in Figure 14 has a straight vertical top section 100 and three sequential
25 bends 102, 104 and 106 below said top, each comprising a corrugated section of straw. Straight downwardly inclined sections 108 and 110 descend sequentially from bends 102 and 104, respectively. Bend 104 bears upon the inner wall of the cylindrical container at a first
30 position therein and bend 106 bears upon the inner wall the cylindrical container at a second position therein, where the first and second positions are diametrically opposed from each other. Bend 106 leads to corrugated curved region 112 which follows the curved contour of the

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cylindrical container at the base thereof and bears upon a portion of the circumference of said base.

It will be appreciated that the coiling of the straw along the base of the container provides a base support for the straw so that no attachments in the cylindrical container are required to hold the straw, except at the holding mechanism at the lid. This arrangement prevents the straw from moving during shipment. The bottom coil and bends 102, 104 and 106 provide a compressive effect and promote a spring-like action when the straw is moved to the can opening, as described above.

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I claim:

1. A beverage container having a metallic lid,
a bend down panel on said lid to define an opening for
said lid, a rupturable score line to separate said panel
5 from said lid and to facilitate detachment of said panel
from said lid to provide said opening while a portion of
said panel remains hingedly attached to said lid, a non-
detachable pull tab secured to the top of said lid for
applying a force for rupturing said score line and
10 bending said panel downwardly, a rotatable straw delivery
mechanism holding a straw, said mechanism secured to the
underside of said lid, said straw delivery mechanism
positioned to permit said panel to bend downwardly to
provide drinking access through said opening, said panel
15 coming into contact with said straw delivery mechanism
during bending, said contact rotating said straw delivery
mechanism to provide a pop-up straw through said opening.
2. A beverage container having a metallic lid,
20 a bend down panel on said lid to define an opening for
said lid, a rupturable score line to separate said panel
from said lid and to facilitate detachment of said panel
from said lid to provide said opening while a portion of
said panel remains hingedly attached to said lid, a non-
25 detachable pull tab secured to the top of said lid for
applying a force for rupturing said score line and
bending said panel downwardly, a rotatable straw delivery
mechanism holding a straw, said mechanism secured to the
underside of said lid, said straw delivery mechanism
30 pivotally attached to the underside of said lid at a
position to permit downward bending of said panel to
provide drinking access through said opening, said
mechanism positioned so that said downward bending brings
said panel into contact with said mechanism causing

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rotation of said mechanism to deliver a straw to said opening when said panel is depressed.

3. A beverage container having a metallic lid,
5 a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non-
10 detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism holding a straw, said mechanism secured to the underside of said lid, said straw delivery mechanism being out of
15 contact with said panel and clear of said opening as said panel bends downwardly to a first position to provide straw-free drinking access through said opening, said panel coming into contact with said straw delivery mechanism as said panel bends further to a second
20 position, said contact moving said straw delivery mechanism to said opening to provide a pop-up straw through said opening.

4. The beverage container of claim 3 wherein
25 said straw delivery mechanism comprises a U-shaped arm, said arm rotatably secured at an intermediate position thereof to the underside of said lid, one end of said arm having a downwardly projecting elbow to be contacted by the bottom of said panel for rotating said arm, the
30 other end of said arm having a receptacle for holding said straw to be rotated to said opening.

5. The beverage container of claim 3 wherein said straw delivery mechanism comprises an arc-shaped
35 arm, said arm slideably and rotatably secured at one end

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to the underside of said lid, the other end of said arm having a receptacle for holding a straw to be rotated to said opening, said one end of said arm having a downwardly projecting elbow to be contacted by the underside of said panel, said one end secured to said lid by means of a rivet, an elongated slot in said arm at said rivet to enable said arm to slide along said rivet and rotate about said rivet, and guide elements on the underside of said lid to guide said arm as it slides and rotates.

6. The beverage container of claim 5 wherein the exterior of said arc-shaped arm comprises a cam whose movement along one of said guide elements induces rotation.

7. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non-detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said mechanism holding the top of a straw, said panel coming into contact with said mechanism as said panel bends to move said mechanism towards said opening and to provide a pop-up straw through said opening, a section of the bottom of said straw being curved and said curved section bearing upon the junction of said cylindrical wall at said bottom.

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8. The beverage container of claim 7 wherein said section of said straw is corrugated.

9. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non-detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said panel coming into contact with said straw delivery mechanism as said panel bends to move said mechanism towards said opening and to provide a pop-up straw through said opening, at least two sections of said straw being bent to provide bent edges of said straw, and sequential bent edges bearing upon said cylindrical wall at opposing sides thereof, respectively.

10. The beverage container of claim 9 wherein said at least two sections of said straw are corrugated.

11. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non-detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said panel coming into contact

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with said straw delivery mechanism as said panel bends to move said mechanism towards said opening and to provide a pop-up straw through said opening, at least two sections of said straw being bent to provide bent edges of said straw with sequential bent edges bearing upon said cylindrical wall at opposing sides thereof, respectively, and a section of the bottom of said straw being curved so that said section of the bottom of the straw bears upon the junction of said cylindrical wall and said bottom of the container.

12. The beverage container of claim 11 wherein said sections of said straw are corrugated.

13. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non-detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said mechanism holding the top of a straw, the top of said straw extending vertically downwardly from said mechanism, said straw having at least two bends below said top so that said straw has at least two downwardly inclining sections each descending from a bend, the end of the first of said inclining sections bearing on said cylindrical wall at a first position thereon, the end of the second of said inclining sections bearing on said cylindrical wall at a second position thereon, said second position being

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substantially diametrically opposed with respect to said first position.

14. The beverage container of claim 13 wherein
5 said bends of said straw are corrugated.

15. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a
10 rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non-detachable pull tab secured to the top of said lid for applying a
15 force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said mechanism holding the top of a straw, the top of said straw extending vertically downwardly from said mechanism, said straw having at
20 least one bend so that an intermediate section of said straw inclines in a downwardly direction and bears upon said cylindrical wall, the bottom section of said straw being curved with said curved section bearing upon the junction of said cylindrical wall and said bottom.

25

16. The beverage container of claim 15 wherein the section of the straw having said bend and said curved section are corrugated.

30

17. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said
35 lid to provide said opening while a portion of said panel

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remains hingedly attached to said lid, a non- detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said mechanism holding the top of a straw, the top of said straw extending vertically downwardly from said mechanism, said straw having at least two bends below said top so that said straw has at least two downwardly inclining sections, each descending from a bend, the end of the first of said inclining sections bearing on said cylindrical wall at a first position thereon, the end of the second of said inclining sections bearing on said cylindrical wall at a second position thereon, said second position being diametrically opposed with respect to said first position, the bottom section of said straw being curved with said bottom curved section bearing on the curved junction of said cylindrical wall and said bottom.

18. The beverage container of claim 17 wherein said bends and said bottom curved section are corrugated.

19. A beverage container having a metallic lid, a cylindrical wall and a bottom, a bend down panel on said lid to define an opening for said lid, a rupturable score line to separate said panel from said lid and to facilitate detachment of said panel from said lid to provide said opening while a portion of said panel remains hingedly attached to said lid, a non- detachable pull tab secured to the top of said lid for applying a force for rupturing said score line and bending said panel downwardly, a straw delivery mechanism secured to the underside of said lid, said mechanism holding the top of a straw, the top of said straw extending vertically downwardly from said mechanism, said straw having three

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bends below said top, a first downwardly inclined section descending from said first bend to a second bend, said second bend bearing on said cylindrical wall at a first position thereon, a second downwardly inclined section
5 descending from said second bend to a third bend bearing on said cylindrical wall at a second position thereon, said first and said second positions being on diametrically opposite sides of said cylindrical wall, respectively, said third bend leading to a curved bottom
10 section of said straw and said curved bottom section bearing on the curved junction of said cylindrical wall and said bottom.

20. The beverage container of claim 19 wherein
15 said bends comprise corrugated straw sections.

21. The beverage container of claim 19 wherein
aid bends and said curved bottom section comprise
corrugated straw sections.

20

22. A straw for storage entirely within a cylindrical beverage container, said straw having a vertical top section and at least two bends located below said top section with each of said bends having a
25 downwardly inclined section descending therefrom, sequential inclined section inclining downwardly in diametrically opposite directions so that said straw can bear upon the cylindrical wall of said container at diametrically opposite sides of the wall of said
30 container.

23. The straw of claim 22 wherein said bends comprise corrugated straw sections.

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24. A straw for storage entirely within a cylindrical beverage container, said straw having a vertical top section and at least one bend below said top section with an inclined section descending from each bend so that said straw can bear upon the cylindrical wall of said container, and the bottom section of said straw being curved so that said curved section can bear upon the junction of the cylindrical wall and the bottom of said container.

10

25. The straw of claim 24 wherein each bend and said curved section comprise corrugated straw sections.

15

26. A straw for storage entirely within a cylindrical beverage container, said straw having a vertical top section and at least two bends located below said top section with each of said bends having a downwardly inclined section descending therefrom, the end of the first of said inclined sections adapted to bear upon the cylindrical wall of said container at a first position thereon and the end of the second of said sections adapted to bear on the cylindrical wall of said container at a second position thereon, said second position being diametrically opposed with respect to said first position, the bottom section of said straw being curved, said curved section adapted for bearing on the curved junction of the cylindrical wall and the bottom of said container.

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25
30

27. The straw of claim 26 wherein each of said bends and said curved section comprise corrugated straw sections.

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28. A straw for storage entirely within a cylindrical beverage container, said straw having a vertical straight top section and three bends below said top, a first straight downwardly inclined section
5 descending from the first bend to a second bend, said second bend adapted to bear on the cylindrical wall of said container at a first position thereon, a second straight downwardly inclined section descending from said second bend to a third bend, said third bend adapted to
10 bear on the cylindrical wall of said container at a second position thereon, said first and said second positions being at diametrically opposite sides of said cylindrical wall, respectively, said third bend leading to a curved bottom section of said straw, and said curved
15 bottom section adapted for bearing on the curved junction of the cylindrical wall and the bottom of said container.

20 29. The straw of claim 28 wherein each of said bends and said curved bottom section comprise corrugated straw sections.

30. A method for assembling a lid to a
25 cylindrical beverage container wherein said lid has a pull tab and a bend down panel for providing an opening on said lid and wherein the underside of the lid has an attached straw delivery mechanism, said method comprising inserting a spring-like bent straw into said delivery
30 mechanism, inserting said lid with said inserted straw into said container so that said straw bears upon the interior surface of said container, and sealing said lid to said container whereby said straw is compressed in
35 pulling said pull tab and bending down said panel.

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31. A method of using a beverage container whose lid has a pull tab and a bend down panel for providing an opening on said lid wherein the underside of the lid has an attached straw delivery mechanism holding
5 a pop-up straw for delivery through said opening, said method comprising pulling said pull tab to bend down said panel to a first position without actuating said straw delivery mechanism, said first position providing an opening in said lid for drinking from said container
10 without said straw, additionally pulling said pull tab to bend down said panel to a second position, said additional pulling step actuating said straw delivery mechanism to pop up said straw through said opening.

15 32. The method of claim 31 wherein said additional pulling step rotates said straw delivery mechanism.

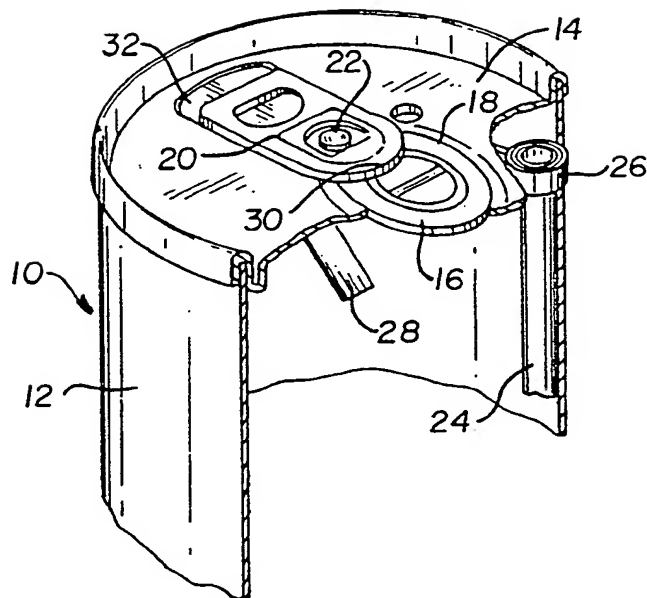


FIG. 1

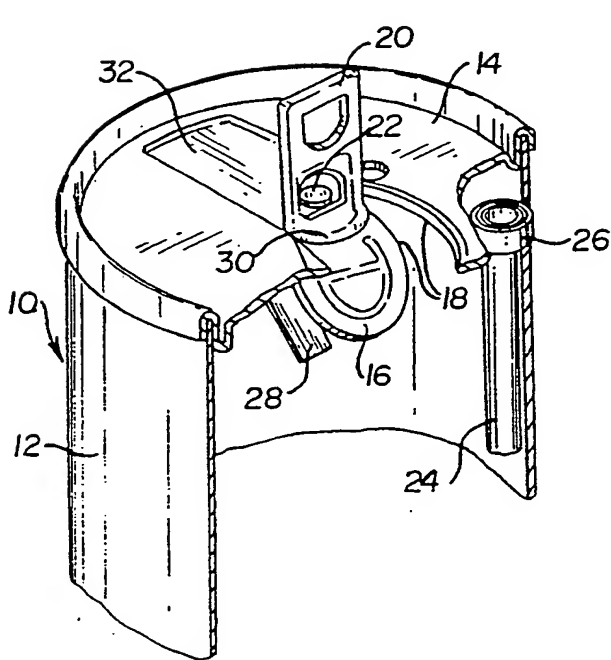


FIG. 2

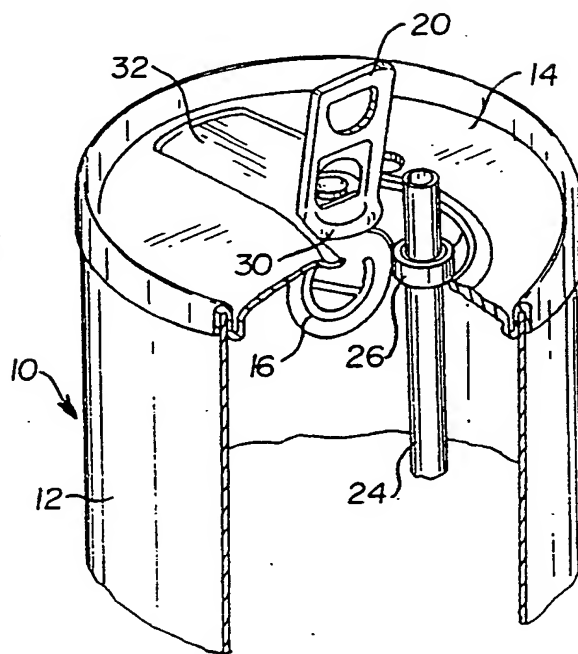


FIG. 3

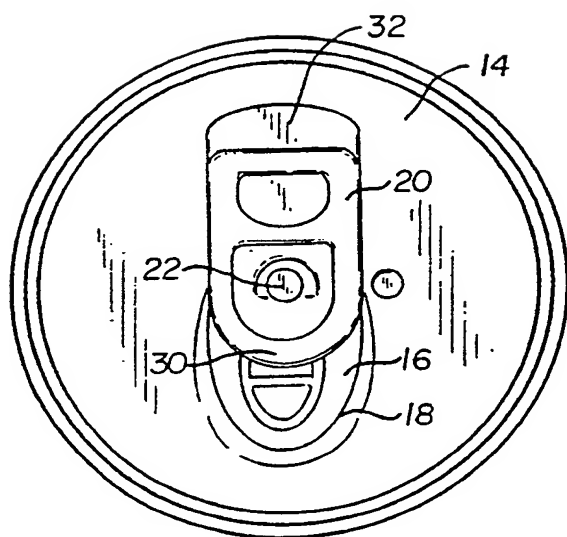


FIG. 4

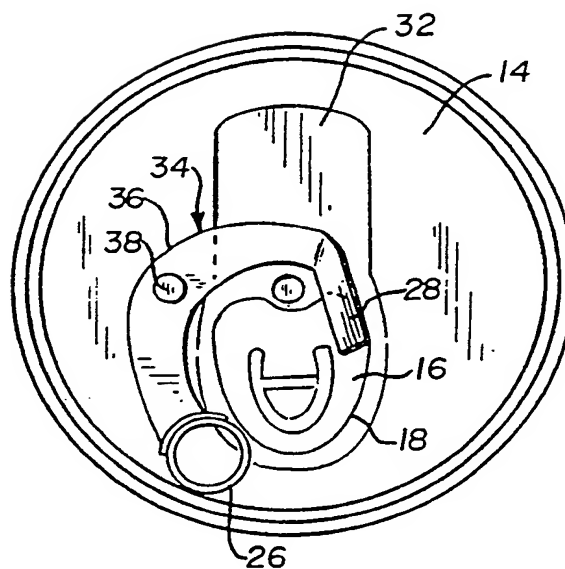


FIG. 5

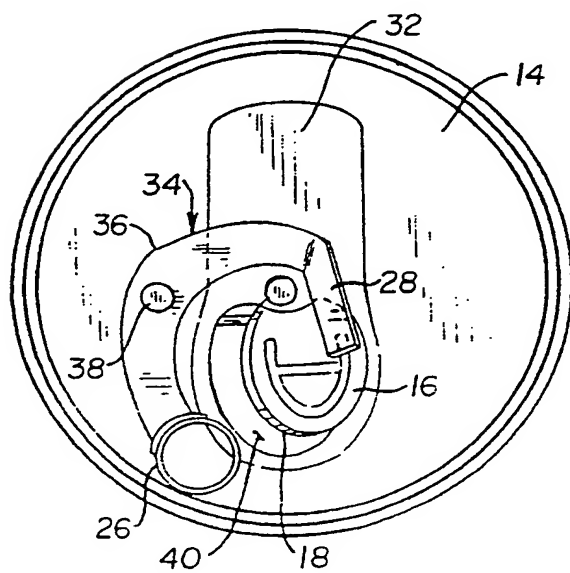


FIG 6

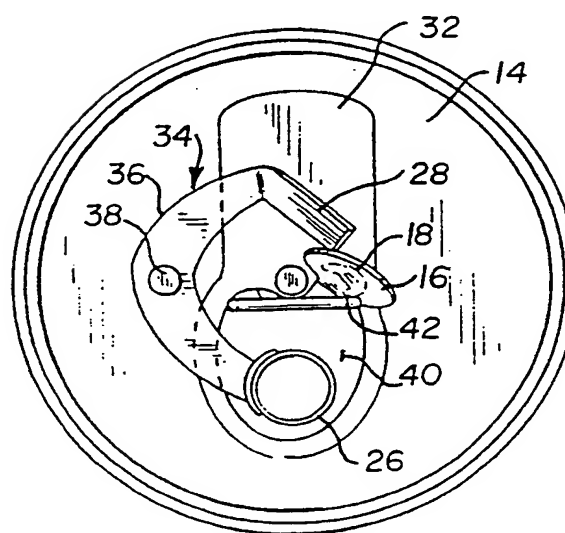


FIG 7

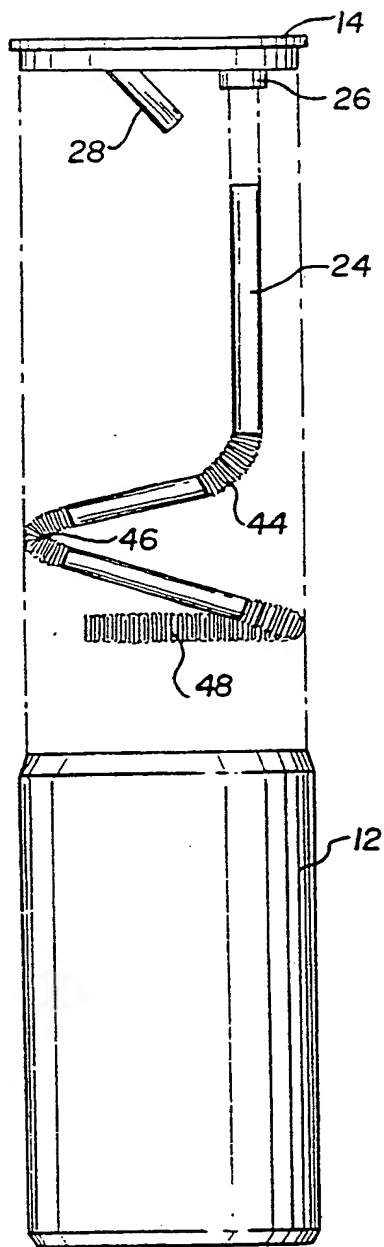


FIG. 9

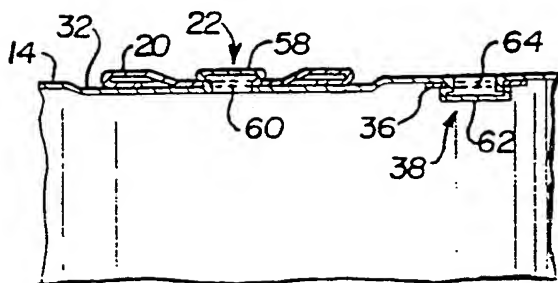


FIG. 11

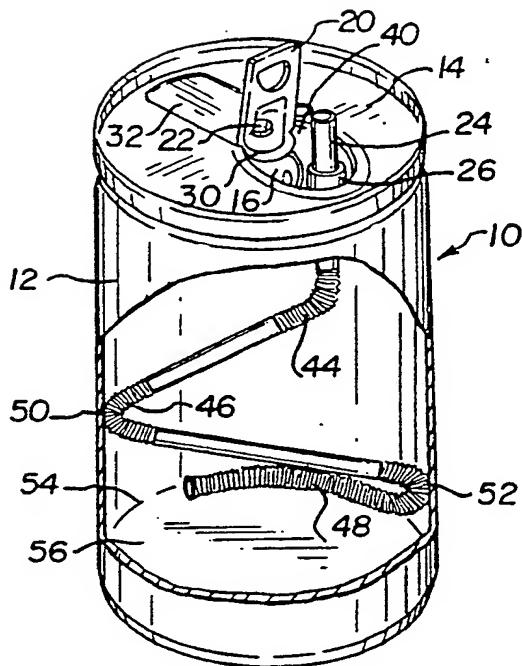


FIG. 8

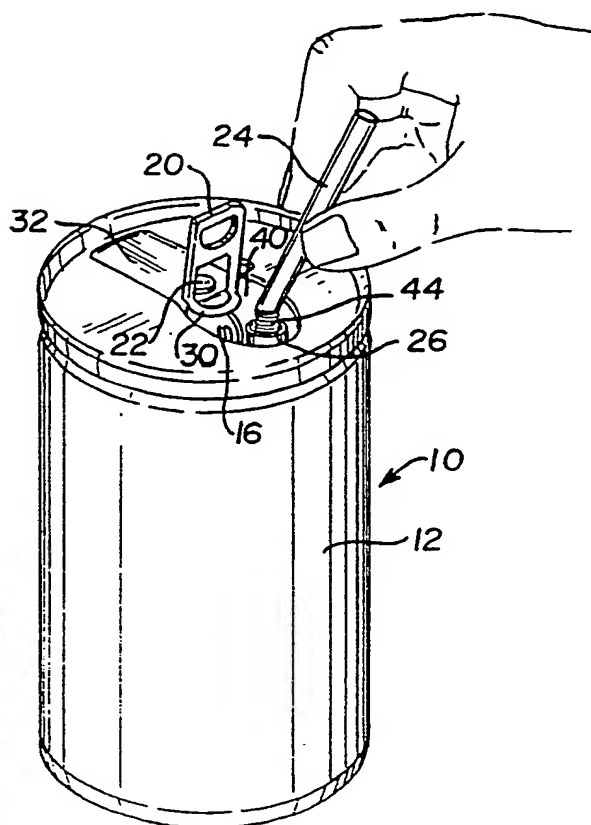


FIG. 10

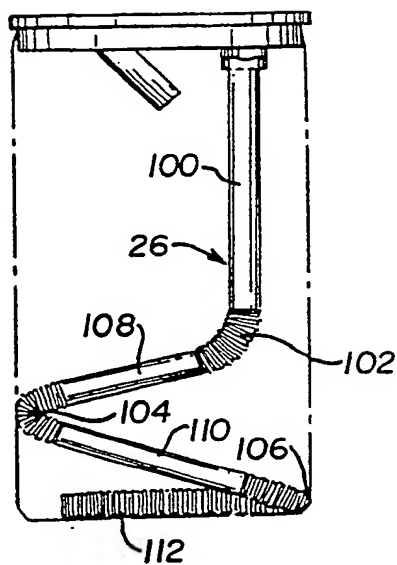


FIG. 14

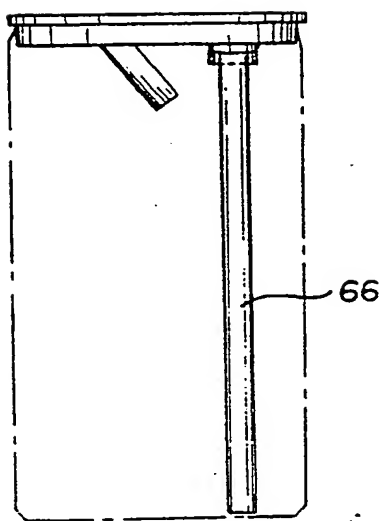


FIG. 12

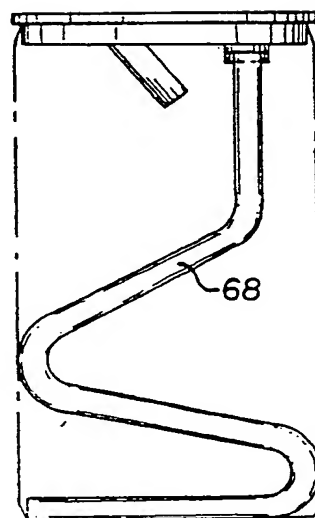


FIG. 13

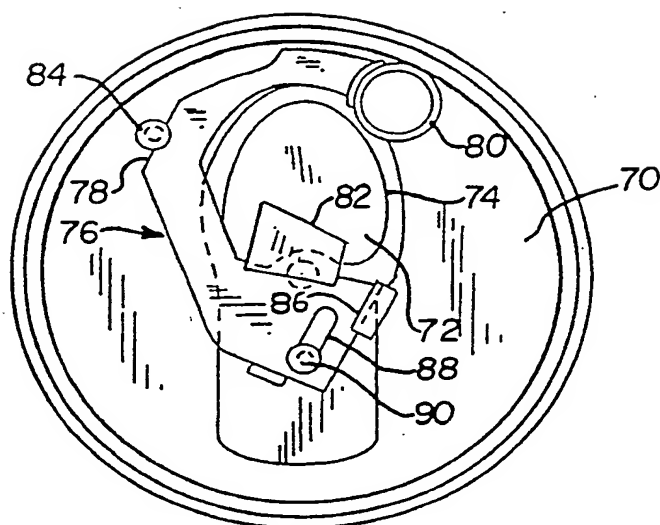


FIG. 15

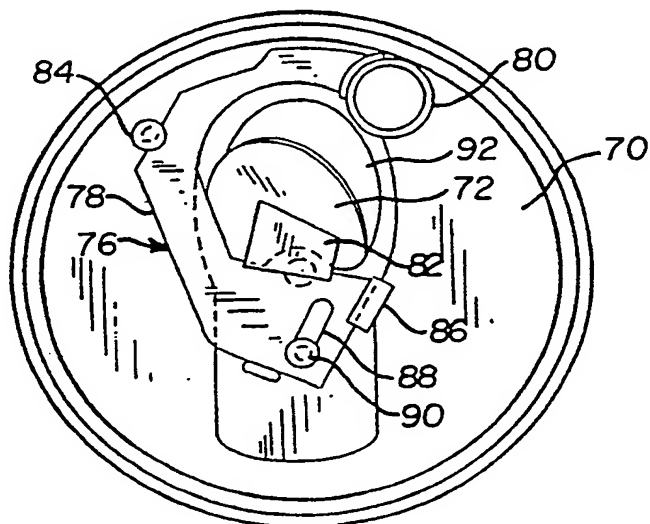


FIG. 16

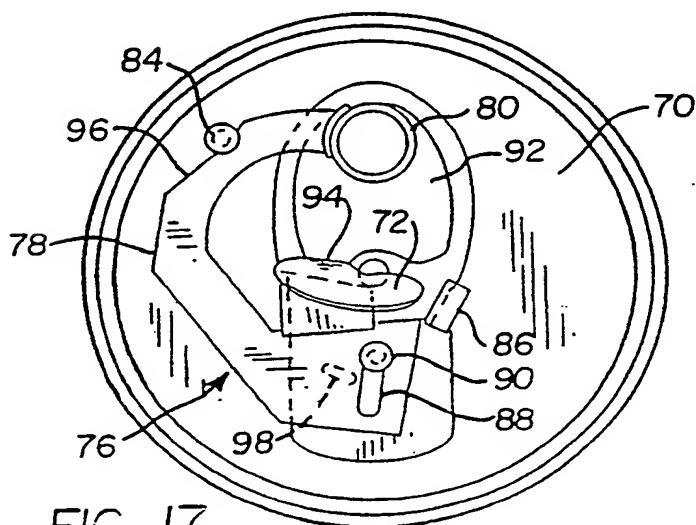


FIG. 17

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US88/03008

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (4): A47G 19/22

II. FIELDS SEARCHED

Minimum Documentation Searched ⁷

Classification System

Classification Symbols

US

215/1A; 220/90.2, 90.4, 90.6; 229/7S

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched ⁸

III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹

Category [*]	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US, A, 4,078,692 (Stein) 14 March 1978 (entire document)	22-30
X	US, A, 4,252,256 (Walsh) 24 Feb. 1981 (entire document)	22-30
X	US, A, 4,424,913 (Ko) 10 January 1984 (entire document)	22-30
X	US, A, 4,537,324 (Wang) 27 August 1985	22-30
A	US, A, 4,684,032 (Tsay) 4 August 1987	
A	US, A, 4,228,913 (Mack et al) 21 Oct. 1980	

* Special categories of cited documents: ¹⁰

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search

Date of Mailing of this International Search Report

28 November 1988

11 JAN 1989

International Searching Authority

Signature of Authorized Officer

ISA/US

Joseph Moy